

FORM PTO-1390 US DEPARTMENT OF COMMERCE REV. 5-93 PATENT AND TRADEMARK OFFICE		ATTORNEYS DOCKET NUMBER P01,0138
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/806406
INTERNATIONAL APPLICATION NO. PCT/EP99/07311	INTERNATIONAL FILING DATE 01 OCTOBER 1999	PRIORITY DATE CLAIMED 01 OCTOBER 1998
TITLE OF INVENTION A METHOD AND APPARATUS FOR HANDLING CALLS REQUIRING THE SUPPORT OF AN INTELLIGENT NETWORK		
APPLICANT(S) FOR DO/EO/US RENATE ZYGAN-MAUS ET AL.		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay. 4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3)). <ol style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input checked="" type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 		
Items 11. to 16. below concern other document(s) or information included:		
11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; (PTO 1449, Prior Art, Search Report, References).		
12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included. (SEE ATTACHED ENVELOPE)		
13. <input checked="" type="checkbox"/> Preliminary Amendment <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.		
14. <input checked="" type="checkbox"/> A substitute specification and substitute specification mark-up.		
15. <input checked="" type="checkbox"/> A change of address letter attached to the Declaration.		
16. <input checked="" type="checkbox"/> Other items or information: <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> Submission of Drawings for Publication and drawing changes b. <input checked="" type="checkbox"/> EXPRESS MAIL #EL 843728518 US dated March 30, 2001 		

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5)

09/806406

INTERNATIONAL APPLICATION NO.
PCT/EP99/07311ATTORNEY'S DOCKET NUMBER
P01,013817. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):**

Search Report has been prepared by the EPO or JPO \$860.00

International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) \$690.00

No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2)) \$710.00

Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO \$1000.00

International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

CALCULATIONS

PTO USE ONLY

\$ 860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).

\$

Claims

Number Filed

Number
Extra

Rate

Total Claims

08

- 20 =

0

X \$ 18.00

\$

Independent Claims

02

- 3 =

0

X \$ 80.00

\$

Multiple Dependent Claims

\$270.00 +

\$

TOTAL OF ABOVE CALCULATIONS =

\$ 860.00

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed.
(Note 37 C.F.R. 1.9, 1.27, 1.28)

\$

SUBTOTAL =

\$ 860.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +

\$

TOTAL NATIONAL FEE =

\$ 860.00

Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). \$40.00 per property +

TOTAL FEES ENCLOSED =

\$ 860.00

Amount to be
refunded

\$

charged

\$

a. ☒ A check in the amount of \$ 860.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **50-1519**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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NAME

28,982

Registration Number

-1-

BOX PCT

IN THE UNITED STATES ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

PRELIMINARY AMENDMENT

APPLICANT: Renate ZYGAN-MAUS et al
ATTORNEY DOCKET NO: P01,0138
INTERNATIONAL APPLICATION NO: PCT/EP99/07311
INTERNATIONAL FILING DATE: 01 October 1999
10 INVENTION: "A METHOD AND APPARATUS FOR HANDLING CALLS
REQUIRING THE SUPPORT OF AN INTELLIGENT
NETWORK"

Assistant Commissioner for Patents,
Washington, D.C. 20231

15 Sir:

As a Preliminary Amendment for entry into the
National Stage for the above-identified PCT application,
the following is submitted:

IN THE SPECIFICATION AND ABSTRACT:

20 Enclosed is a Substitute Specification and Abstract
with amendments incorporated therein. No new matter is
added. A marked-up copy of the specification and
abstract is also enclosed.

IN THE CLAIMS:

Please cancel all claims and insert new claims as follows;

WE CLAIM:

5 9. A method for handling intelligent network calls, comprising the steps of:

 providing a switching center having a server, a basic network and an intelligent network having a service platform, said basic network being based on the
10 intelligent network;

 receiving a query at the server of the switching center from the basic network, said query relating to a received call by the basic network,
 in said server utilizing information contained in the
15 query for determining whether the received call requires said intelligent network to support handling of the received call, and if so;

 passing the query to said service platform of the intelligent network so that the query appears to the
20 service platform to come from the switching center.

 10. A method according to claim 9, further comprising the step of:

 evaluating an Intelligent Network Application part of a signaling message part of the query for a
25 determination of a network operator.

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said server receiving a query from the switching center of the basic network, said query relating to a call received by the basic network, said server utilizing information contained in the query for determining whether the intelligent network supports the call, and if so, said server passing the query to the service platform.

16. A system according to claim 15, further comprising the step of:

responding via the server to the query by stating routing information relating to a gateway in the basic network provided that the call is not being initiated in the basic network.

REMARKS

The specification, abstract and drawings have been amended in accordance with U. S. practice.

New claims are presented corresponding to the PCT claims but drawn in accordance with U. S. practice. These amendments do not narrow the claims and were not made for patentability reasons pursuant to the Festo decision.

Respectfully submitted,

 (Reg. No. 28,982)

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ATTORNEY FOR APPLICANTS

CUSTOMER NUMBER 26574

Substitute
Specification

SPECIFICATION

TITLE

A METHOD AND APPARATUS FOR HANDLING CALLS REQUIRING THE SUPPORT OF AN INTELLIGENT NETWORK

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method and apparatus for handling network calls, and in particular to an interaction between a basic network and an intelligent network for handling network calls that require the support of the intelligent network.

Description of the Related Art

As the markets for public telecommunications services open up, call number portability is also required for IN service call numbers in many countries, that is to say IN service subscribers can keep their IN service call number when they change to another network operator/service provider.

An AT&T method for providing call number portability is known from the document EP-A-0 827 319. According to this method, when a call is made using a ported subscriber call number from a switching center, a query to a service platform (SCP) of an intelligent network for supporting handling of the call is started. The service platform (SCP) responds to the query by reporting to the switching center the "Location Routing Number", on the basis of which the switching center routes the call to what is now the end switching center of the ported subscriber.

When a number of intelligent networks are present, operators of a public network must be able to route calls to individual IN service call numbers to that (intelligent) network which is supporting this IN service call number. Previously known solutions can lead to capacity problems in the IN service platforms (service control point SCP) or in the switching centers in the basic network (an intelligent network (IN) may be regarded as a basic network to which the IN functions comprising the service switching function SSF, service control function SCF, service management function SMF and the corresponding interfaces to the basic network have been added. Thus, in contrast to a basic call, an IN call requires not only the basic network functionality, but also the specific IN functions).

Normal IN services are those in which the public number dialed to set up a connection itself uniquely identifies the IN service subscriber. This is generally the case with dialed IN services. Possible special forms of dialed IN services, in which the IN service subscriber call number is checked only after accessing the IN service, using a dialog via the user channel, can in principle still be handled in the same way as normal IN services once the IN service subscriber call number has been received.

Previous solutions for IN service call number portability can be split into two categories:

A. Solutions with reactions on one's own IN service platform

B. Solutions with a query to a call number portability server before a query to one's own IN service platform.

A) Solutions with reactions on one's own IN service platform

In these solutions, a normal IN query to one's own IN service platform is carried out by the basic network for all IN service call numbers (those which are supported by one's own IN service platform and those which are supported by service platforms in other networks). The IN service platform confirms whether it is supporting the dialed IN service call number or whether the dialed IN service call number is being supported by another network. In both cases, the IN service platform indicates to the requesting basic network switching center via the existing IN signaling how the call is to be handled further. For example, the IN service platform can instruct the switching center to pass on the call to the responsible network, by determining a network identification and reporting this to the switching center as routing information.

In Type A solutions, the capacity of the IN service platform is partially consumed for handling external IN service call numbers, which can lead to capacity bottlenecks for handling its own IN service call numbers. Since the basic network uses the same trigger mechanism for its own and for external IN service call numbers, load limitation procedures must not be used for queries from the IN service platform in the switching centers (call gapping functions) which would also affect external IN service call numbers (for example a service-related load limit).

B) Solutions with a query to a call number portability server before a query to one's own IN service platform

In order to ensure that one's own IN service platform need handle only its own IN service call numbers, the basic network uses the IN signaling to ask for a

special call number portability server (NP server; NP = Number Portability) for all the
dialed IN service call numbers. The NP server confirms whether the dialed IN
service call number is being supported in its own network or in another network. The
NP server uses the IN signaling to instruct the requesting switching center how the
call is to be handled further. For its own IN service call numbers, the basic network
carries out a normal IN query to its own IN service platform following a query from
the NP server. For external IN service call numbers, the call is routed to the
responsible external network in accordance with the instructions from the NP server.
In Type B solutions, the capacity of one's own IN service platform is protected, but
additional basic network capacity is required for this purpose for prior queries in the
case of a special NP server. If decoupled trigger mechanisms are used for the prior
query in the case of the NP server and for the subsequent query in the case of one's
own IN service platform, service-related and call-number-related load limitation
procedures can be used without any restriction for the IN service platform (call
gapping functions) in the switching centers.

SUMMARY OF THE INVENTION

The invention is based on the object of specifying a method for handling IN
calls which allows IN service call number portability to be provided without any
additional capacity requirements for the switching centers or the IN service platforms
in the public telephone network.

An exemplary embodiment of the invention will be described in the following text with reference to the drawing, which comprises two figures.

An NP server provides a call number portability function, which will be described in more detail in the following text, is initiated by a normal IN query from a switching center in the basic network, and can pass this IN query on to an IN service platform in its own network, if this is a query to one of its own IN service call numbers.

The method according to the invention does not require any additional capacity, either in the switching centers in the basic network or in the IN service platforms.

When the method according to the invention is used, the IN load limitation procedures in the switching centers for IN queries to the IN service platforms (call gapping functions) are in fact no longer used, since they could also relate to external IN service call numbers. Other load limitation mechanisms, for example in the NP server, can be used instead of the load limitation procedures in the switching centers.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic illustration of solutions with reaction's on one's own intelligent network service platform according to the present invention.

Figure 2 is a schematic illustration of solutions with a query to a call number portability server before a query to one's own intelligent network service platform based on the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

5 In the more detailed explanation of the method according to the invention which now follows, the standardized signaling system #7 is assumed by way of example as the signaling system on which the intelligent network is based. However, the invention can also be used when signaling methods other than the method according to #7 are used for transporting application data (TCAP, INAP). If IP (Internet Protocol) is used, the IP address would need to be assessed and manipulated instead of the SCCP GlobalTitles (Note: examples already exist where IP is used for transportation of application data in conventional telecommunications networks (PSTN, PLMN)).

10 A switching center in the basic network identifies a dialed IN service call number. When a sufficient number of dialed digits are present in order to uniquely identify the IN service subscriber, the switching center sends an IN query (containing the dialed IN service call number) in accordance with the normal IN signaling procedure for its network to an NP server according to the invention. The passing of the message via the NP server is transparent to the switching center, that is to say

15 the switching center "thinks" that it is passing the IN query to an IN service platform.

20 When, for example, using ETSI signaling standards, the switching center sends the following SCCP/TCAP message:

SCCP/TCAP message "UNIT-DATA/BEGIN", which contains the INAP operation "InitialDP" with the parameters

- servicekey = IN service identification (for example for personal call numbers)
- calledPartyNumber = contains a dialed IN service call number.

5 The SCCP address of the NP server is stored as the Global Title X in the switching center.

There are two possible versions which can be used for the rest of the procedure, which are referred to in the following text as (solution) version a) and b) whose explanation will be assisted by Figure 1 (version a)) and Figure 2 (version b)).

10 Version a):

15 The INAP message is evaluated in the NP server, and the servicekey parameter is used to branch to a specific IN service call number portability program (SNP application, where SNP = Service Number Portability). This program checks which network is supporting the dialed IN service call number. If the IN service call number is being supported by another network, the NP server determines the required routing information (for example the network identification of a gateway node to the other network) and instructs the requesting switching center to route the call to this gateway.

20 If ETSI signaling standards are being used, the NP server in this case sends, for example, the following SCCP/TCAP message to the switching center:
within an SCCP/TCAP message UNIT-DATA/END the INAP-Operation Connect with the parameters

- destinationRoutingAddress = network identification

- cutAndPaste = 0.

If the IN service call number is being supported by its own network, the NP server uses the IN service call number to determine an SCCP address for its own responsible IN service platform; for example, the IN service call number can itself be used as the global title for SCCP addressing of the IN service platform. The NP server passes the original message from the switching center via the #7 signaling network on to its own responsible IN service platform. The NP server can make the process of passing on the message dependent on IN service platform-related overload control criteria. If a message cannot be passed on, the NP server can instruct the sending switching center to cancel the call.

If, for example, ETSI signaling standards are being used, the NP server sends the following SCCP/TCAP message:
within an SCCP/TCAP message UNIT-DATA/BEGIN the INAP-operation InitialDP with the parameters

- servicekey = IN service identification (for example for personal call numbers)
- CalledPartyNumber = dialed IN service call number.

The original message remains unchanged even at the TCAP level. In particular, the NP server uses the same TCAP dialog ID allocated by the switching center. At the SCCP level, the NP server indicates as the destination address the new SCCP address which has been determined, for example the SCCP-GlobalTitle = dialed IN service call number. The NP server quotes the source of the message as

the SCCP address received in the original message from the requesting switching center.

The passing of the message through the NP server is thus transparent to the IN service platform, that is to say the IN service platform "thinks" that it has received the IN query directly from the switching center. The IN service platform thus processes the IN query in the same way as a direct IN query from the switching center, and sends an appropriate response to the switching center.

Version b):

The SCCP message is already evaluated in the NP server; a specific SCCP service call number portability program (SCCP-SNP application) checks the network operator to which the SCCP address, which was derived in the SSP from the dialed IN service call number, belongs.

Owing to the large amount of data, the SNP (Service Number Portability) program and associated data are best located at a central point. This can be done by integration with a Signaling Transfer Point/Signaling Relay Point (STP/SPR), and possibly also with an SCP. Integration with the SSP is also possible, but is less attractive.

If the SCCP address and/or IN service call number belongs to another network, the INAP message is passed on via TCAP to an IN service call number portability program. This checks the network operator which is supporting the dialed IN service call number, determines the required routing information and instructs the requesting switching center to route the call to this network (see Version 2a).

If, in contrast, the SCCP address and/or IN service call number is being supported by its own network, the NP server uses the SCCP CdPN to determine a new SCCP address for its own responsible IN service platform. The NP server passes the original message from the switching center via the #7 signaling network on to its own responsible IN service platform. This solution version allows the SCCP/TCAP message to be passed on without including the TCAP and application levels, and is thus dynamically better than Version 2a.

The following applies in the same way to the two versions mentioned:

An IN service platform receives from the switching center the IN query passed on from the NP server. The process of passing the message via the NP server is transparent to the IN service platform, that is to say the IN service platform "thinks" that it has received the message directly from a requesting switching center. The IN service platform thus processes the IN query in the same way as a direct IN query from the switching center, and thus also sends the response to the IN query to the switching center, and not to the NP server.

The passing of the message via the NP server is likewise transparent to the switching center. The TCAP dialog initiated by the switching center is controlled by the IN service platform in accordance with the standardized TCAP procedures.

Although other modifications and changes may be suggested by those skilled in the art, it is the intention of the inventors to embody within the patent warranted hereon all changes and modifications as reasonably and properly come within the scope of their contribution to the art.

ABSTRACT OF DISCLOSURE

A method and apparatus for handling network calls that require the support of an intelligent network. From a query by the switching center, an intelligent network is being determined based on which basis network the received call is being initiated from. The network calls' handling is then supported by the determined intelligent network.

5

[Description] S P E C I F I C A T I O N**[Method for handling calls] TITLE****A METHOD AND APPARATUS FOR HANDLING CALLS REQUIRING
THE SUPPORT OF AN INTELLIGENT NETWORK****BACKGROUND OF THE INVENTION****Field of the Invention**

The present invention relates to a method and apparatus for handling network calls, and in particular to an interaction between a basic network and an intelligent network for handling network calls that require the support of the intelligent network.

Description of the Related Art

As the markets for public telecommunications services open up, call number portability is also required for IN service call numbers in many countries, that is to say IN service subscribers can keep their IN service call number when they change to another network operator/service provider.

An AT&T method for providing call number portability is known from the document EP-A-0 827 319. According to this method, when a call is made using a ported subscriber call number from a switching center, a query to a service platform (SCP) of an intelligent network for supporting handling of the call is started. The service platform (SCP) responds to the query by reporting to the switching center the "Location Routing Number", on the basis of which the switching center routes the call to what is now the end switching center of the ported subscriber.

When a number of intelligent networks are present, operators of a public network must be able to route calls to individual IN service call numbers to that (intelligent) network which is supporting this IN service call number. Previously known solutions can lead to capacity problems in the IN service platforms (service control point SCP) or in the switching centers in the basic network ~~((explanation:))~~ (an intelligent network (IN) may be regarded as a basic network to which the IN functions comprising the service switching function SSF, service control function SCF, service management function SMF and the corresponding interfaces to the basic network have been added. Thus, in contrast to a basic call, an IN call requires not {

only the basic network functionality, but also the specific IN functions).

Normal IN services are those in which the public number dialed to set up a connection itself uniquely identifies the IN service subscriber. This is generally the case with dialed IN services. Possible special forms of dialed IN services, in which the IN service subscriber call number is checked only after accessing the IN service, using a dialog via the user channel, can in principle still be handled in the same way as normal IN services once the IN service subscriber call number has been received.

Previous solutions for IN service call number portability can be split into two categories:

- A. Solutions with reactions on one's own IN service platform
- B. Solutions with a query to a call number portability server before a query to one's own IN service platform.

~~{Re-A:}~~ A) **Solutions with reactions on one's own IN service platform**

In these solutions, a normal IN query to one's own IN service platform is carried out by the basic network for all IN service call numbers (those which are supported by one's own IN service platform and those which are supported by service platforms in other networks). The IN service platform confirms whether it is supporting the dialed IN service call number or whether the dialed IN service call number is being supported by another network. In both cases, the IN service platform indicates to the requesting basic network switching center via the existing IN signaling how the call is to be handled further. For example, the IN service platform can instruct the switching center to pass on the call to the responsible network, by determining a network identification and reporting this to the switching center as routing information.

In Type A solutions, the capacity of the IN service platform is partially consumed for handling external IN service call numbers, which can lead to capacity bottlenecks for handling its own IN service call numbers. Since the basic network uses the same trigger mechanism for its own and for external IN service call numbers, load limitation procedures must not be used for queries from the IN service platform in the switching centers (call gapping functions) which would also affect external IN service call numbers (for example a service-related load limit).

B) **Solutions with a query to a call number portability server before a query to**

one's own IN service platform ~~{Re-B:}~~

In order to ensure that one's own IN service {

}platform need handle only its own IN service call numbers, the basic network uses
 the IN signaling to ask for a special {
 }call number portability server (NP server; NP = Number Portability) for all the dialed
 IN service call numbers. The NP server confirms whether the dialed IN service call
 5 number is being supported in its own network or in another network. The NP server
 uses the IN signaling to instruct the requesting switching center how the call is to be
 handled further. For its own IN service call numbers, the basic network carries out a
 normal IN query to its own IN service platform following a query from the NP server.
 For external IN service call numbers, the call is routed to the responsible external
 10 network in accordance with the instructions from the NP server.
 In Type B solutions, the capacity of one's own IN service platform is protected, but
 additional basic network capacity is required for this purpose for prior queries in the
 case of a special NP server. If decoupled trigger mechanisms are used for the prior
 query in the case of the NP server and for the subsequent query in the case of one's
 15 own IN service platform, service-related and call-number-related load limitation
 procedures can be used without any restriction for the IN service platform (call
 gapping functions) in the switching centers.

SUMMARY OF THE INVENTION

The invention is based on the object of specifying a method for handling IN
 20 calls which allows IN service call number portability to be provided without any

additional capacity requirements for the switching centers or the IN service platforms in the public telephone network.

An exemplary embodiment of the invention will be described in the following text with reference to the drawing, which comprises two figures.

5 An NP server provides a call number portability function, which will be described in more detail in the following text, is initiated by a normal IN query from a switching center in the basic network, and can pass this IN query on to an { }IN service platform in its own network, if this is a query to one of its own IN service call numbers.

10 The method according to the invention does not require any additional capacity, either in the switching centers in the basic network or in the IN service platforms.

15 When the method according to the invention is used, the IN load limitation procedures in the switching centers for IN queries to the IN service platforms (call gapping functions) are in fact no longer used, since they could also relate to external IN service call numbers. Other load limitation mechanisms, for example in the NP server, can be used instead of the load limitation procedures in the switching centers.

BRIEF DESCRIPTION OF THE DRAWINGS

20 **Figure 1 is a schematic illustration of solutions with reaction's on one's own intelligent network service platform according to the present invention.**

Figure 2 is a schematic illustration of solutions with a query to a call number portability server before a query to one's own intelligent network service platform based on the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

5 In the more detailed explanation of the method according to the invention which now follows, the standardized signaling system #7 is assumed by way of example as the signaling system on which the intelligent network is based. However, the invention can also be used when signaling methods other than the method according to #7 are used for transporting application data (TCAP, INAP). If IP (Internet Protocol) is used, the IP address would need to be assessed and manipulated instead of the SCCP GlobalTitles (Note: examples already exist where IP is used for transportation of application data in conventional telecommunications networks (PSTN, PLMN)).

10 A switching center in the basic network identifies a dialed IN service call number. When a sufficient number of dialed digits are present in order to uniquely identify the IN service subscriber, the switching center sends an IN query (containing the dialed IN service call number) in accordance with the normal IN signaling procedure for its network to an NP server according to the invention. The passing of the message via the NP server is transparent to the switching center, that is to say

15 the {

20 }switching center "thinks" that it is passing the IN query to an IN service platform.

When, for example, using ETSI signaling standards, the switching center sends the following SCCP/TCAP message:

SCCP/TCAP message "UNIT-DATA/BEGIN", which contains the INAP operation "InitialDP" with the parameters

- 5 - servicekey = IN service identification (for example for personal call numbers)
- calledPartyNumber = contains a dialed IN service call number.

The SCCP address of the NP server is stored as the Global Title X in the switching center.

There are two possible versions which can be used for the rest of the procedure, which are referred to in the following text as (solution) version a) and b) whose explanation will be assisted by Figure 1 (version a)) and Figure 2 (version b)).

Version a):

The INAP message is evaluated in the NP server, and the servicekey parameter is used to branch to a specific IN service call number portability program (SNP application, where SNP = Service Number Portability). This program checks which network is supporting the dialed IN service call number. If the IN service call number is being supported by another network, the NP server determines the required routing information (for example the network identification of a gateway node to the other network) and instructs the requesting switching center to route the call to this gateway.

If ETSI signaling standards are being used, the NP server in this case sends, for example, the following SCCP/TCAP message to the switching center:

within an SCCP/TCAP message UNIT-DATA/END the INAP-Operation Connect with the parameters

- destinationRoutingAddress = network identification
- cutAndPaste = 0.

5 If the IN service call number is being supported by its own network, the NP server uses the IN service call number to determine an SCCP address for its own responsible IN service platform; for example, the IN service call number can itself be used as the global title for SCCP addressing of the IN service platform. The NP server passes the original message from the switching center via the #7 signaling network on to its own responsible IN service platform. The NP server can make the process of passing on the message dependent on IN service platform-related overload control criteria. If a message cannot be passed on, the NP server can instruct the sending switching center to cancel the call.

10 If, for example, ETSI signaling standards are being used, the NP server sends the following SCCP/TCAP message:

15 within an SCCP/TCAP message UNIT-DATA/BEGIN the INAP-operation InitialDP with the parameters

- servicekey = IN service identification (for example for personal call numbers)
- CalledPartyNumber = dialed IN service call number.

20 The original message remains unchanged even at the TCAP level. In particular, the NP server uses the same TCAP dialog ID allocated by the switching center. At the SCCP level, the NP server indicates as the destination address the

new SCCP address which has been determined, for example the SCCP-GlobalTitle = dialed IN service call number. The NP server quotes the source of the message as the SCCP address received in the original message from the requesting switching center.

5 The passing of the message through the NP server is thus transparent to the IN service platform, that is to say the IN service platform "thinks" that it has received the IN query directly from the switching center. The IN service platform thus processes the IN query in the same way as a direct IN query from the switching center, and sends an appropriate response to the switching center.

10 Version b):

 The SCCP message is already evaluated in the NP server; a specific SCCP service call number portability program (SCCP-SNP application) checks the network operator to which the SCCP address, which was derived in the SSP from the dialed IN service call number, belongs.

15 (Insert: Owing to the large amount of data, the SNP (Service Number Portability) program and associated data are best located at a central point. This can be done by integration with a Signaling Transfer Point/Signaling Relay Point (STP/SPR), and possibly also with an SCP. Integration with the SSP is also possible, but is less attractive.)

20 If the SCCP address and/or IN service call number belongs to another network, the INAP message is passed on via TCAP to an IN service call number portability program. This checks the network operator which is supporting the dialed

IN service call number, determines the required routing information and instructs the requesting switching center to route the call to this network (see Version 2a).

If, in contrast, the SCCP address and/or IN service call number is being supported by its own network, the NP server uses the SCCP CdPN to determine a new SCCP address for its own responsible IN service platform. The NP server passes the original [message from the switching center via the #7 signaling network on to its own responsible IN service platform. This solution version allows the SCCP/TCAP message to be passed on without including the TCAP and application levels, and is thus dynamically better than Version 2a.

The following applies in the same way to the two versions mentioned:

An IN service platform receives from the switching center the IN query passed on from the NP server. The process of passing the message via the NP server is transparent to the IN service platform, that is to say the IN service platform "thinks" that it has received the message directly from a requesting switching center. The IN service platform thus processes the IN query in the same way as a direct IN query from the switching center, and thus also sends the response to the IN query to the switching center, and not to the NP server.

The passing of the message via the NP server is likewise transparent to the switching center. The TCAP dialog initiated by the switching center is controlled by the IN service platform in accordance with the standardized TCAP procedures.

Although other modifications and changes may be suggested by those skilled in the art, it is the intention of the inventors to embody within the patent warranted hereon all changes and modifications as reasonably and properly come within the scope of their contribution to the art.

5

ABSTRACT OF DISCLOSURE

A method and apparatus for handling network calls that require the support of an intelligent network. From a query by the switching center, an intelligent network is being determined based on which basis network the received call is being initiated from. The network calls' handling is then supported by the determined intelligent network.

----- REVISION LIST -----

The bracketed numbers refer to the Page and Paragraph for the **start** of the paragraph in both the **old** and the **new** documents.

[1:1 1:1] Changed "Description" to "S P E C I ... A T I O N"

[1:2 1:2] Add Paras "TITLE ... the Related Art"

[1:2 1:9] Del Para "Method for handling calls"

[1:5 2:1] Changed "(explanation: " to "("

[3:3 3:1] Changed "Re A:" to "A) Solutions ... service platform"

[3:6 3:4] Add Para "B) Solutions with ... service platform"

[3:6 3:6] Del Para "Re B:"

[5:3 4:2] Add Para "SUMMARY OF THE INVENTION"

[7:4 5:5] Add Paras "BRIEF DESCRIPTION ... PREFERRED
EMBODIMENT"

[12:4 10:5] Add Paras "Although other ... intelligent network."

GR 98 P 2869

Description

5 Method for handling calls

As the markets for public telecommunications services open up, call number portability is also required for IN service call numbers in many countries, that is to say IN service subscribers can keep their IN service call number when they change to another network operator/service provider.

An AT&T method for providing call number portability is known from the document EP-A-0 827 319. According to this method, when a call is made using a ported subscriber call number from a switching center, a query to a service platform (SCP) of an intelligent network for supporting handling of the call is started. The service platform (SCP) responds to the query by reporting to the switching center the "Location Routing Number", on the basis of which the switching center routes the call to what is now the end switching center of the ported subscriber.

When a number of intelligent networks are present, operators of a public network must be able to route calls to individual IN service call numbers to that (intelligent) network which is supporting this IN service call number. Previously known solutions can lead to capacity problems in the IN service platforms (service control point SCP) or in the switching centers in the basic network (explanation: an intelligent network (IN) may be regarded as a basic network to which the IN functions comprising the service switching function SSF, service control function SCF, service management function SMF and the corresponding interfaces to the basic network have been added. Thus, in contrast to a basic call, an IN call requires not

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only the basic network functionality, but also the specific IN functions).

- 5 Normal IN services are those in which the public number dialed to set up a connection itself uniquely identifies the IN service subscriber. This is generally the case with dialed IN services. Possible special forms of dialed IN services, in which the IN
- 10 service subscriber call number is checked only after accessing the IN service, using a dialog via the user channel, can in principle still be handled in the same way as normal IN services once the IN service subscriber call number has been received.
- 15 Previous solutions for IN service call number portability can be split into two categories:

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AMENDED PAGE

A. Solutions with reactions on one's own IN service platform

B. Solutions with a query to a call number portability server before a query to one's own IN service platform.

Re A:

In these solutions, a normal IN query to one's own IN service platform is carried out by the basic network for all IN service call numbers (those which are supported by one's own IN service platform and those which are supported by service platforms in other networks). The IN service platform confirms whether it is supporting the dialed IN service call number or whether the dialed IN service call number is being supported by another network. In both cases, the IN service platform indicates to the requesting basic network switching center via the existing IN signaling how the call is to be handled further. For example, the IN service platform can instruct the switching center to pass on the call to the responsible network, by determining a network identification and reporting this to the switching center as routing information.

In Type A solutions, the capacity of the IN service platform is partially consumed for handling external IN service call numbers, which can lead to capacity bottlenecks for handling its own IN service call numbers. Since the basic network uses the same trigger mechanism for its own and for external IN service call numbers, load limitation procedures must not be used for queries from the IN service platform in the switching centers (call gapping functions) which would also affect external IN service call numbers (for example a service-related load limit).

Re B:

In order to ensure that one's own IN service

call number portability server (NP server; NP = Number Portability) for all the dialed IN service call numbers. The NP server confirms whether the dialed IN service call number is being supported in its own
5 network or in another network. The NP server uses the IN signaling to instruct the requesting switching center how the call is to be handled further. For its own IN service call numbers, the basic network carries out a normal IN query to its own IN service platform
10 following a query from the NP server. For external IN service call numbers, the call is routed to the responsible external network in accordance with the instructions from the NP server.

In Type B solutions, the capacity of one's own IN
15 service platform is protected, but additional basic network capacity is required for this purpose for prior queries in the case of a special NP server. If decoupled trigger mechanisms are used for the prior query in the case of the NP server and for the
20 subsequent query in the case of one's own IN service platform, service-related and call-number-related load limitation procedures can be used without any restriction for the IN service platform (call gapping functions) in the switching centers.

25 The invention is based on the object of specifying a method for handling IN calls which allows IN service call number portability to be provided without any additional capacity requirements for the switching centers or the IN service platforms in the
30 public telephone network.

An exemplary embodiment of the invention will be described in the following text with reference to the drawing, which comprises two figures.

35 An NP server provides a call number portability function, which will be described in more detail in the following text, is initiated by a normal IN query from a switching center in the basic network, and can pass this IN query on to an

IN service platform in its own network, if this is a query to one of its own IN service call numbers.

The method according to the invention does not require any additional capacity, either in the switching centers in the basic network or in the IN service platforms.

When the method according to the invention is used, the IN load limitation procedures in the switching centers for IN queries to the IN service platforms (call gapping functions) are in fact no longer used, since they could also relate to external IN service call numbers. Other load limitation mechanisms, for example in the NP server, can be used instead of the load limitation procedures in the switching centers.

In the more detailed explanation of the method according to the invention which now follows, the standardized signaling system #7 is assumed by way of example as the signaling system on which the intelligent network is based. However, the invention can also be used when signaling methods other than the method according to #7 are used for transporting application data (TCAP, INAP). If IP (Internet Protocol) is used, the IP address would need to be assessed and manipulated instead of the SCCP GlobalTitles (Note: examples already exist where IP is used for transportation of application data in conventional telecommunications networks (PSTN, PLMN)).

A switching center in the basic network identifies a dialed IN service call number. When a sufficient number of dialed digits are present in order to uniquely identify the IN service subscriber, the switching center sends an IN query (containing the dialed IN service call number) in accordance with the normal IN signaling procedure for its network to an NP server according to the invention. The passing of the message via the NP server is transparent to the switching center, that is to say the

switching center "thinks" that it is passing the IN query to an IN service platform.

When, for example, using ETSI signaling standards, the switching center sends the following
5 SCCP/TCAP message:

SCCP/TCAP message "UNIT-DATA/BEGIN", which contains the INAP operation "InitialDP" with the parameters

- servicekey = IN service identification (for example for personal call numbers)
- 10 - calledPartyNumber = contains a dialed IN service call number.

The SCCP address of the NP server is stored as the Global Title X in the switching center.

There are two possible versions which can be
15 used for the rest of the procedure, which are referred to in the following text as (solution) version a) and b) whose explanation will be assisted by Figure 1 (version a)) and Figure 2 (version b)).

20 Version a):

The INAP message is evaluated in the NP server, and the servicekey parameter is used to branch to a specific IN service call number portability program (SNP application, where SNP = Service Number
25 Portability). This program checks which network is supporting the dialed IN service call number. If the IN service call number is being supported by another network, the NP server determines the required routing information (for example the network identification of
30 a gateway node to the other network) and instructs the requesting switching center to route the call to this gateway.

If ETSI signaling standards are being used, the NP server in this case sends, for example, the following SCCP/TCAP message to the switching center:

within an SCCP/TCAP message UNIT-DATA/END the INAP-

5 Operation Connect with the parameters

- destinationRoutingAddress = network identification

- cutAndPaste = 0.

If the IN service call number is being supported by its own network, the NP server uses the IN
10 service call number to determine an SCCP address for its own responsible IN service platform; for example, the IN service call number can itself be used as the global title for SCCP addressing of the IN service platform. The NP server passes the original message
15 from the switching center via the #7 signaling network on to its own responsible IN service platform. The NP server can make the process of passing on the message dependent on IN service platform-related overload control criteria. If a message cannot be passed on, the
20 NP server can instruct the sending switching center to cancel the call.

If, for example, ETSI signaling standards are being used, the NP server sends the following SCCP/TCAP message:

25 within an SCCP/TCAP message UNIT-DATA/BEGIN the INAP-operation InitialDP with the parameters

- servicekey = IN service identification (for example for personal call numbers)

- CalledPartyNumber = dialed IN service call number.

30 The original message remains unchanged even at the TCAP level. In particular, the NP server uses the same TCAP dialog ID allocated by the switching center. At the SCCP level, the NP server indicates as the destination address the new SCCP address which has been
35 determined, for example the SCCP-GlobalTitle = dialed IN service call number. The NP server quotes the source of the message as the SCCP address received in the original message from the requesting switching center.

The passing of the message through the NP server is thus transparent to the IN service platform, that is to say the IN service platform "thinks" that it has received the IN query directly from the switching center. The IN service platform thus processes the IN query in the same way as a direct IN query from the switching center, and sends an appropriate response to the switching center.

10 Version b):

The SCCP message is already evaluated in the NP server; a specific SCCP service call number portability program (SCCP-SNP application) checks the network operator to which the SCCP address, which was derived in the SSP from the dialed IN service call number, belongs.

(Insert: Owing to the large amount of data, the SNP (Service Number Portability) program and associated data are best located at a central point. This can be done by integration with a Signaling Transfer Point/Signaling Relay Point (STP/SPR), and possibly also with an SCP. Integration with the SSP is also possible, but is less attractive.)

If the SCCP address and/or IN service call number belongs to another network, the INAP message is passed on via TCAP to an IN service call number portability program. This checks the network operator which is supporting the dialed IN service call number, determines the required routing information and instructs the requesting switching center to route the call to this network (see Version 2a).

If, in contrast, the SCCP address and/or IN service call number is being supported by its own network, the NP server uses the SCCP CdPN to determine a new SCCP address for its own responsible IN service platform. The NP server passes the original

message from the switching center via the #7 signaling network on to its own responsible IN service platform. This solution version allows the SCCP/TCAP message to be passed on without including the TCAP and application levels, and is thus dynamically better than Version 2a.

The following applies in the same way to the two versions mentioned:

An IN service platform receives from the switching center the IN query passed on from the NP server. The process of passing the message via the NP server is transparent to the IN service platform, that is to say the IN service platform "thinks" that it has received the message directly from a requesting switching center. The IN service platform thus processes the IN query in the same way as a direct IN query from the switching center, and thus also sends the response to the IN query to the switching center, and not to the NP server.

The passing of the message via the NP server is likewise transparent to the switching center. The TCAP dialog initiated by the switching center is controlled by the IN service platform in accordance with the standardized TCAP procedures.

Patent Claims

- 5 1. A method for handling calls, according to which
- a switching center in a network which is based on
an intelligent network as the basic network starts
a query to an intelligent network relating to a
received call for whose handling the support of an
10 intelligent network is required,
- said query is received by a specific server, which
uses the information contained in the query to
determine the intelligent network by which the
call is being supported,
15 - said server passes on said query to a service
platform in the intelligent network which has been
determined if the call was initiated in the basic
network of the intelligent network which has been
determined,
20 - said query is passed on to said service platform
in such a manner that, as seen from that service
platform, it appears to come from said switching
center.
- 25 2. The method as claimed in claim 1,
characterized in that
the INAP part of the signaling message is evaluated for
said determination of the network operator.

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3. The method as claimed in claim 1,
5 characterized in that
the SCCP part of the signaling message is evaluated for
said determination of the network operator.

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4. The method as claimed in one of claims 1 to 3,
5 characterized in that
said query is transmitted using signaling system No. 7.

5. The method as claimed in one of claims 1 to 5,
characterized in that
10 said query is transmitted using an IP-based network.

6. The method as claimed in one of claims 1 to 5,
characterized in that
- said NP server responds to the IN query by stating
15 the routing information relating to a gateway of
the network operator which has been determined if
the network operator which has been determined is
not that network operator within whose network the
IN call was initiated,
20 - the switching center passes on the IN call to said
gateway.

7. A server which
- receives from a switching center in a network a
25 query relating to a call which requires the
support of an intelligent network for its
handling,
- uses the information contained in the query to
determine which intelligent network supports said
30 call,
- passes the query on to a service platform in the
intelligent network which has been determined if
the call was initiated in that network which is
based on the intelligent network which was
35 determined as the basic network.

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8. The server as claimed in claim 7,
5 characterized in that
said server responds to said query by stating routing
information relating to a gateway in the basic network
on which the intelligent network which has been
determined is based, if the call was not initiated in
10 that network which is based on the intelligent network
which was determined as the basic network.

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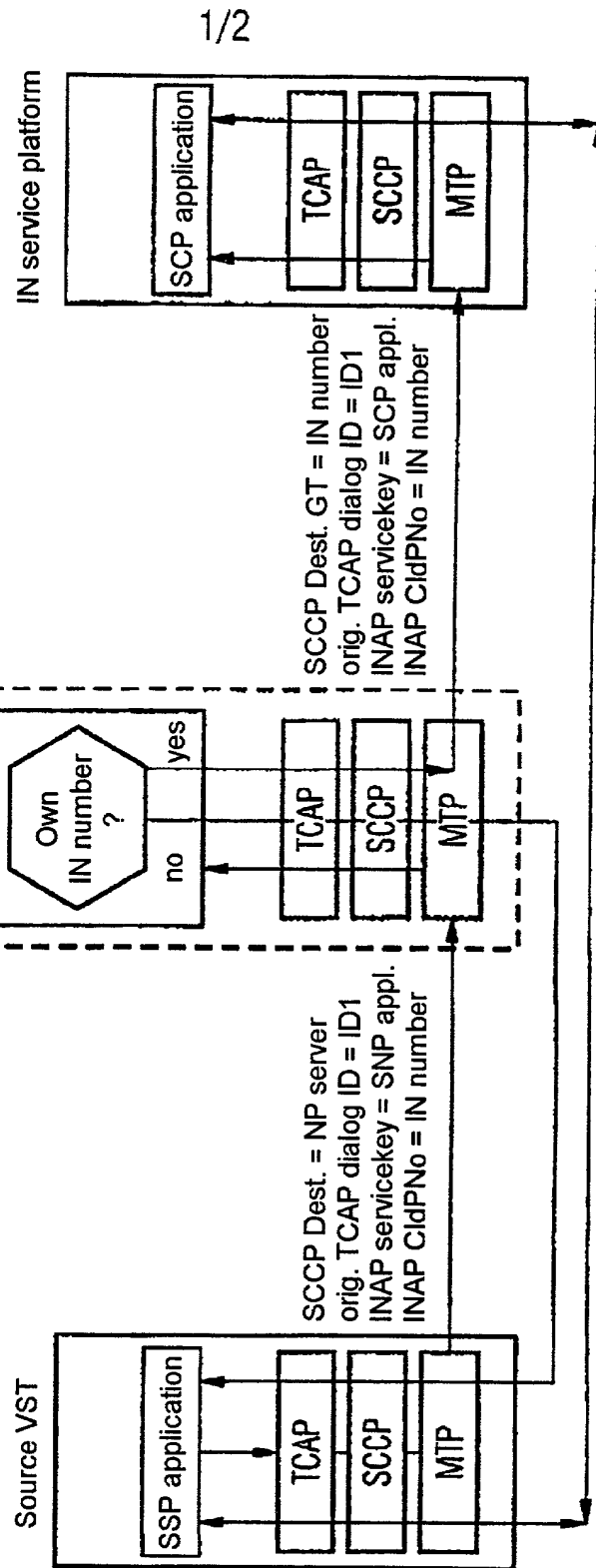
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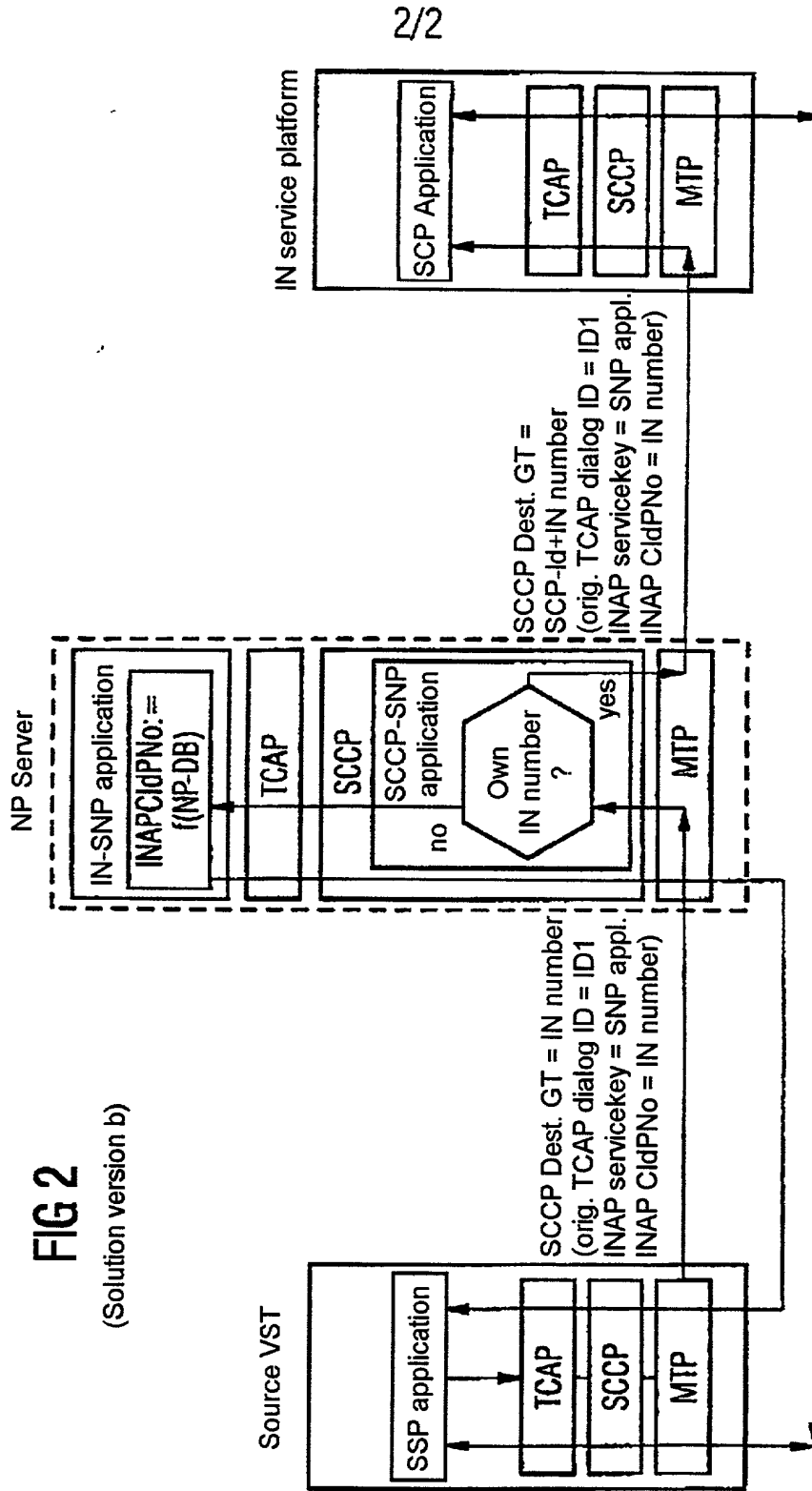
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FIG 1

(Solution version a)





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APPLICANT(S): Renate ZYGAN-MAUS et al
ATTORNEY DOCKET NO.: P01,0138
INTERNATIONAL APPLICATION NO: PCT/EP99/07311
INTERNATIONAL FILING DATE: 01 October 1999
INVENTION: A METHOD AND APPARATUS FOR HANDLING CALLS REQUIRING THE
SUPPORT OF AN INTELLIGENT NETWORK

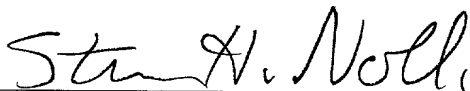
Assistant Commissioner for Patents,
Washington D.C. 20231

S I R:

Members of the firm of Hill & Simpson designated on the original Power of Attorney have merged into the firm of Schiff Hardin & Waite. All future correspondence for the above-referenced application therefore should be sent to the following address:

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Declaration and Power of Attorney For Patent Application**Erklärung Für Patentanmeldungen Mit Vollmacht****German Language Declaration**

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Verfahren zur Behandlung von IN-Calls

deren Beschreibung

(zutreffend/ja/yes ankreuzen)

☒ hier beigefügt ist.

☐ am _____ als

PCT internationale Anmeldung

PCT Anwendungsnummer _____

Eingereicht wurde und am _____

Abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

the specification of which

(check one)

☐ is attached hereto.

☐ was filed on _____ as

PCT international application

PCT Application No. _____

and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications
Priorität beansprucht

Priority Claimed

98 11 8584.6 Germany (EP)

01. Oktober 1998

(Number) (Country)
(Nummer) (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☒ ☐
Yes No
Ja Nein

(Number) (Country)
(Nummer) (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

(Number) (Country)
(Nummer) (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer fruheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der fruheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgegeben)

(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
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(Status)
(patentiert, anhängig,
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(Status)
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German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

And I hereby appoint

Messrs. John D. Simpson (Registration No. 19,842) Lewis T. Steadman (17,074), William C. Stueber (16,453), P. Phillips Connor (19,259), Dennis A. Gross (24,410), Marvin Moody (16,549), Steven H. Noll (28,982), Brett A. Valiquet (27,841), Thomas I. Ross (29,275), Kevin W. Guynn (29,927), Edward A. Lehmann (22,312), James D. Hobart (24,149), Robert M. Barrett (30,142), James Van Santen (16,584), J. Arthur Gross (13,615), Richard J. Schwarz (13,472) and Melvin A. Robinson (31,870), David R. Metzger (32,919), John R. Garrett (27,888) all members of the firm of Hill, Steadman & Simpson, A Professional Corporation.

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A Professional Corporation
85th Floor Sears Tower, Chicago, Illinois 60606

Voller Name des einzigen oder ursprünglichen Erfinders: ZYGAN-Maus, Renate	Full name of sole or first inventor: _____
Unterschrift des Erfinders Datum <i>Renate Zygán-Maus</i>	Inventor's signature Date _____
Wohnsitz D-81477 München, Germany DEX	Residence _____
Staatsangehörigkeit Bundesrepublik Deutschland	Citizenship _____
Postanschrift Glöttleweg 35	Post Office Address _____
D-81477 München	_____
Bundesrepublik Deutschland	_____
Voller Name des zweiten Miterfinders (falls zutreffend): RUCKSTUHL, Hanspeter	Full name of second joint inventor, if any: _____
Unterschrift des Erfinders Datum <i>H- Ruckstuhl 12.10.87</i>	Second Inventor's signature Date _____
Wohnsitz D-82515 Wolfratshausen, Germany DEX	Residence _____
Staatsangehörigkeit Bundesrepublik Deutschland	Citizenship _____
Postanschrift Wolframstr. 20	Post Office Address _____
D-82515 Wolfratshausen	_____
Bundesrepublik Deutschland	_____

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).